the other contoured bodies 6. In particular, this permits, in accordance with the development shown in Figure 19, axial displacement of the coupling bolts 36 and in this way, securing of the contoured body 6 mechanically in a force-free state. If a force is subsequently exerted on the contoured body 6, this is passed on via the then coupled-on coupling bolt 36.

Figure 20 and Figure 21 show another development of a coupling of the contoured body 6, which is located in a twelfth camshaft 72. Whereas a section of a coupling element 73 can be seen in Figure 20, the position of the coupling element 73, illustrated with reference to the contoured body 6, is shown in Figure 21. The coupling element 73 has an axis 74, which is located at an angle to a camshaft axis 75. By the angular arrangement of the axis 74, on the one hand, a simpler processing of the twelfth camshaft 72 is possible. The introduction of a corresponding pocket borehole can be undertaken with great precision. Furthermore, the angular arrangement permits force transmission by means of a radially acting and an axially acting force fraction, with a coupling of the coupling element 73 with the contoured body 6. This improves the reliability of the force transmission and avoids, in particular, a point or line load of the force-transmitting elements.

The invention under consideration is suitable, in particular, for use with diesel engines, which are operated in stationary or nonstationary operation. Preferably, the invention is used for an internal exhaust gas recirculation. This is preferably combined with the possibility of an engine brake.

Claims

1. Piston combustion engine (1) with gas inlet valves and gas outlet valves, which can be actuated via at least one camshaft (3), wherein a cam (7) has, as a control contour, a base circle contour (8) and a cam contour (10), which projects radially beyond the base circle contour (8), characterized in that a contoured body (6) with an additional cam structure (11) has a position at rest, which is simultaneously an active position, wherein the contoured body projects beyond the base circle contour in its position at rest in a permanently yielding manner, and when passed over with a force transmission element, is pressed radially into the base circle contour (8) and the permanent yieldingness is blocked in its active position.

2. Piston combustion engine (1) according to Claim 1, characterized in that the contoured body makes possible, in its active position, an internal exhaust gas recirculation.

3. Piston combustion engine (1) according to Claim 1 or 2, characterized in that the contoured body (6), which can be brought into an active position by means of an adjusting device (5), with an additional cam contour (11) is located in a flank (9) of the cam contour (10).

4. Piston combustion engine (1) according to one of the preceding claims, characterized in that the additional cam contour (11) is located, at least in the immediate vicinity, before a transition of the cam contour (10) into the base circle contour (8) of the cam (7).

5. Piston combustion engine (1) with gas inlet valves and gas outlet valves, which can be actuated via at least one camshaft (3), wherein a cam (7) has, as a control contour, a base circle contour (8) and a cam contour (10), which projects radially beyond the base circle contour (8), and a contour body (6), which can be brought into an active position by means of an adjusting device (5), with an additional cam contour (11) is located in the camshaft (3), characterized in that the adjusting device (5) exerts a force in the direction of the active position of the contoured body, which can be changed in an adjustable manner.

6. Piston combustion engine (1) according to Claim 5, characterized in that the adjusting device (5) has a hydraulic device for the creation of force.

7. Piston combustion engine (1) according to Claim 6, characterized in that the adjusting device (5) also has a spring.

8. Piston combustion engine (1) according to Claim 5, 6, or 7, characterized in that the additional cam contour (11) projects beyond the flank (9) of the cam contour (10), only in the active position.

9. Piston combustion engine (1) according to one of Claims 5-8, characterized in that the additional cam contour (11) projects beyond the flank (9) of the cam contour (10) in a position at rest.

10. Piston combustion engine (1) with gas inlet valves and gas outlet valves, which can be actuated via at least one camshaft (3), wherein a cam (7) has, as a control contour, a base circle contour (8) and a cam contour (10), which projects radially beyond the gas circle contour (8), and a contoured body (6), which can be brought into an active position by means of an adjusting device (5), with an additional cam contour (11) is located in the camshaft (3), characterized in that a contoured body guide is located eccentrically, relative to the middle of the camshaft (33) and/or to a valve transmission device.

11. Piston combustion engine (1) with gas inlet valves and gas outlet valves, which can be actuated via at least one camshaft (3), wherein a cam (7) has, as a control contour, a base circle contour (8) and a cam contour (10), which projects radially beyond the base circle contour (8), and a contoured body (6), which can be brought into an active position by means of an adjusting device (5), with an additional cam contour (11) is located in the camshaft (3), characterized in that the adjusting device (5) has a mechanical coupling element, which is connected to a contoured body (6), which can move in the radial direction along a straight line, for the activation and thereby simultaneous fixing of the contoured body (6).

12. Piston combustion engine (1) according to Claim 11, characterized in that the contoured body assumes its active position in its position at rest.

13. Piston combustion engine (1) according to Claim 11 or 12, characterized in that the coupling element has a coupling bolt (36).

14. Piston combustion engine (1) according to Claim 11, 12, or 13, characterized in that the camshaft (3) has several additional cam contours (11) with contoured bodies (6), which can

be fixed via several coupling elements, which are in mutual coupled connection for the transmission of a joint activation and fixing of the contoured bodies (6).

15. Piston combustion engine (1) according to one of the preceding Claims 1-14, characterized in that a contoured body actuation is a component of a regulation concept for the internal exhaust recirculation.

16. Piston combustion engine (1) according to one of the preceding Claims 1-14, characterized in that with an engine braking, the contoured body (6) can be activated for the actuation of an exhaust gas valve.

17. Piston combustion engine with gas inlet and gas outlet valves, which can be actuated via at least one camshaft, wherein the individual cams have, as a control contour, a base circle contour and a cam contour, which projects beyond the base circle contour, and wherein for at least a part of the valves, preferably gas outlet valves, a contoured body with at least one additional cam contour is located on the correlated cams, and this contoured body can be brought into an active position, which projects beyond the base circle contour of the cam, characterized in that the additional contoured body is in the form of a mushroom, which has an elongated stroke cam and a guide body, which is preferably cylindrical, wherein the elongated stroke cam is conducted, at least on one side, in a groove transverse to the camshaft axis in the base circle and/or cam profile of the camshaft in the form of a rotation securing element, and the guide body, which lies radially inwards, is conducted in a guide, preferably in a guide borehole, in the camshaft, and the additional contoured body can be displaced radially.

18. Piston combustion engine according to Claim 17, characterized in that the contoured body can be brought into the active position by means of the adjusting device and/or can be locked in it.

19. Piston combustion engine according to Claim 17 or 18, characterized in that the diameter of the cylindrical guide body is larger than the width of the elongated stroke cam.

20. Piston combustion engine according to Claim 17, 18, or 19, characterized in that the additional contoured body is located eccentrically in the camshaft longitudinal axis.

21. Piston combustion engine according to one of the preceding claims, characterized in that the additional contoured body is located eccentrically relative to the pertinent cam.

22. Piston combustion engine according to one of the preceding claims, characterized in that the pertinent cam and/or the additional contoured body is located eccentrically relative to the pertinent cam successor.

23. Piston combustion engine according to Claim 22, characterized in that with a bulgedly constructed cam successor, the pertinent cam and/or the additional contoured body are constructed in a special shape, preferably, inclined, conically, bulgedly or spatially shaped, in order to avoid edge carriers.

24. Piston combustion engine according to one of the preceding claims, characterized in that the elongated stroke cam and/or the cylindrical guide body is/are located eccentrically relative to the camshaft longitudinal axis.

25. Piston combustion engine according to one of the preceding claims, characterized in that the radially extended movement of the additional contoured body is limited by a mechanical stop in the adjusting device or in the system.

26. Piston combustion engine according to one of the preceding claims, characterized in that a force, preferably the force of a spring, acts between the additional contoured body and the camshaft and in the deactivated state, it always keeps the additional contoured body in contact with the stop in the extended position or in contact with the cam successor.

27. Piston combustion engine according to one of the preceding claims, characterized in that the adjusting device is formed by a mechanical supporting device, which is actuated via actuation means.

28. Piston combustion engine according to one of the preceding claims, characterized in that the adjusting device is a slide rod or rotating rod, on which an adjusting element is located for each contoured body to be controlled.

29. Piston combustion engine according to Claim 28, characterized in that the adjusting elements are located on the adjusting device, indirectly via storage elements, preferably springs, so that when activated or switched off via the adjusting device, each adjusting element can be controlled automatically at different times.

30. Piston combustion engine according to Claim 28 or 29, characterized in that the adjusting element and the contact area in the guide body with the adjusting element is constructed at an incline or in stepped form.

31. Piston combustion engine according to Claim 28 or 29, characterized in that the adjusting element and the contact area in the guide body with the adjusting element are constructed in the form of two opposing combs, in order to ensure a large overlapping area for the fixing of the additional contoured body with a small movement of the adjusting device.

32. Piston combustion engine according to Claims 27-31, characterized in that a guide sleeve connected in a fixed manner to the camshaft, is located between the cylindrical guide body and the camshaft.

33. Piston combustion engine according to Claim 32, characterized in that the guide sleeve comprises the storage functions for the individual adjusting element.

34. Piston combustion engine according to Claims 18-33, characterized in that the adjusting device has mechanical adjusting elements and hydraulic control.

35. Piston combustion engine according to Claim 34, characterized in that the mechanical adjusting elements are located in the camshaft longitudinal axis and can be displaced in it hydraulically and with the force of a spring.

36. Piston combustion engine according to Claim 34, characterized in that the mechanical adjusting elements are located in a direction that differs from the camshaft longitudinal axis, which is perpendicular to the direction of movement of the additional contoured body, and can be displaced hydraulically and with the force of a spring.

37. Piston combustion engine according to Claim 36, characterized in that a borehole for the mechanical adjusting elements is placed at an incline next to the cams located on the camshaft.

38. Piston combustion engine according to Claim 36, characterized in that a borehole for the adjusting elements is located radially through the base circle of the pertinent cam of the camshaft.

39. Piston combustion engine according to one of the preceding claims, characterized in that the adjusting element is constructed in the form of a toggle lever and thus an automatic locking is possible.

40. Piston combustion engine according to one of the preceding claims, characterized in that the adjusting device or the adjusting elements are constructed with the function of ballpoint pen mechanics--that is, with a single actuation, an automatic fixing of the additional contour in the extended position takes place; with the next actuation, there is an automatic switching off of the additional contour.

41. Piston combustion engine according to one of the preceding claims, characterized in that the adjusting device has a hydraulic supporting device, which can be actuated via actuation means.

42. Piston combustion engine according to Claim 41, characterized in that a control element, preferably a tube, is located in the camshaft, in that a hydraulic adjusting element is located between the cylindrical guide body of the additional contoured body and the camshaft, and in that the hydraulic adjusting element functions in the form of a hydraulic compensation for play and in addition is designed so that it can be turned on or off via the control element.

43. Piston combustion engine according to one of the preceding claims, characterized in that boreholes are located in the control element and open or close the pressure chamber of the adjusting elements by displacement or rotation.

44. Piston combustion engine according to one of the preceding claims, characterized in that the functions [sic] of a compensation for play with a precontrolled check valve is located between the cylindrical guide body of the additional contoured body and the camshaft in such a way that with a missing or low oil pressure, no compensation is possible and with oil pressure or oil pressure above a defined switching pressure, a compensation occurs and thus the additional contoured body is moved into the active position and fixed.

45. Piston combustion engine according to Claim 44, characterized in that an additional supporting element is located between the cylindrical guide body and the piston for the compensation for play in such a way that in the active state, via the compensation for play, the

supporting element with the additional contoured body is extended to the stop and therefore the supporting element can fit free of play on the guide body, and in that in the deactivated state, the force, preferably of a spring, located between the additional contoured body and the supporting element brings the supporting element to the block--that is, into the radially inside end position of the compensation for play, and the force acting on the additional contoured body ensures the contact to the cam successor or stop, without the compensation for play cyclically changing the volume.

46. Piston combustion engine according to Claim 44 or 45, characterized in that the cylindrical guide body of the additional cam contour is guided via the supporting element and an outside guide sleeve in the camshaft.

47. Piston combustion engine according to Claim 46, characterized in that the outside guide sleeve, as an installation unit, in addition to the supporting element and the guide element of the additional contour body, also comprises the hydraulic components, such as the check valve and the precontrol piston with the precontrol spring and/or the stop for the movement of the additional cam contour.

48. Piston combustion engine according to Claim 47, characterized in that the installation unit is pressed on positions into the camshaft and additional adjustment activities are not necessary.

49. Piston combustion engine according to one of the preceding claims, characterized in that the additional stroke function of the actively controlled contour body brings about at least one valve movement in the base circular area of the base cam.

50. Piston combustion engine according to one of Claims 17-48, characterized in that the additional stroke function of the actively controlled contoured body brings about a changed closing or opening movement--that is, a changed stroke function in the flank and base circle area or the base circle and flank area of the base movement.

51. Piston combustion engine according to Claim 50, characterized in that the stroke profile of the controlled contoured body has a profile different from the base circle of the base cam either at the beginning or at the end of the effective area, in order to improve in this way the transition between the flank and the additional profile.

52. Piston combustion engine according to one of Claims 17-48, characterized in that the additional stroke function of the actively controlled contoured body effects a partially changed valve movement of the base valve stroke.

53. Piston combustion engine according to one of the preceding claims, characterized in that the stroke function switch by means of the additional contoured body is used for the torsion and/or tumble switch.

54. Piston combustion engine according to one of the preceding claims, characterized in that the stroke function switch by means of an additional contoured body is used as an engine brake.

55. Piston combustion engine according to one of the preceding claims, characterized in that the stroke function switch by means of the additional contoured body is used for internal exhaust gas recirculation.

56. Piston combustion engine according to one of the preceding claims, characterized in that the stroke function switch by means of the additional contoured body is used to improve the loading by gas dynamics.

57. Piston combustion engine according to one of the preceding claims, characterized in that to improve the camshaft-cam successor contact, the cam successor is constructed with a contact body that can at least move in the camshaft longitudinal axis.

58. Piston combustion engine according to Claim 57, characterized in that the movable contact body is formed on the cam successor as an elephant foot.

59. Piston combustion engine according to one of the preceding claims, characterized in that the additional contoured body is used on the inlet side or the outlet side or on the inlet side and the outlet side.

60. Use of a piston combustion engine (1) with gas inlet valves and gas outlet valves, which can be actuated via at least one camshaft (3), wherein a cam (7) has, as a control contour, a base circle contour (8) and a cam contour (10), which projects radially beyond the base circle contour (8) and in addition, the camshaft (3) has an additional cam contour (11), which is used for an internal exhaust gas recirculation.

61. Use of a piston combustion engine (1) according to one of the preceding Claims 1-59, with an internal exhaust gas recirculation to reduce pollutant emission in the exhaust gas.

62. Use of a piston combustion engine (1) according to one of the preceding claims, in a truck for the braking of the truck using an engine brake.